PROFILE PUBLICATIONS

The De Havilland D.H.5

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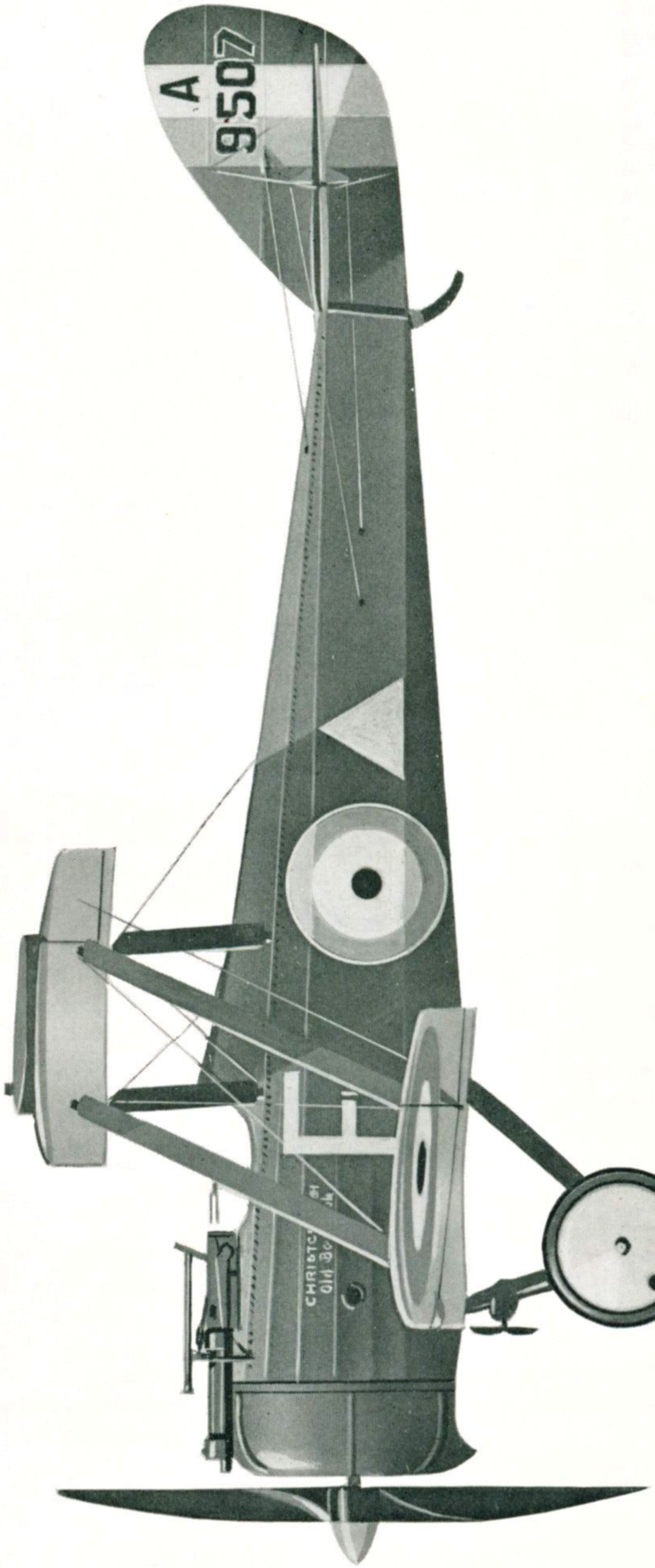

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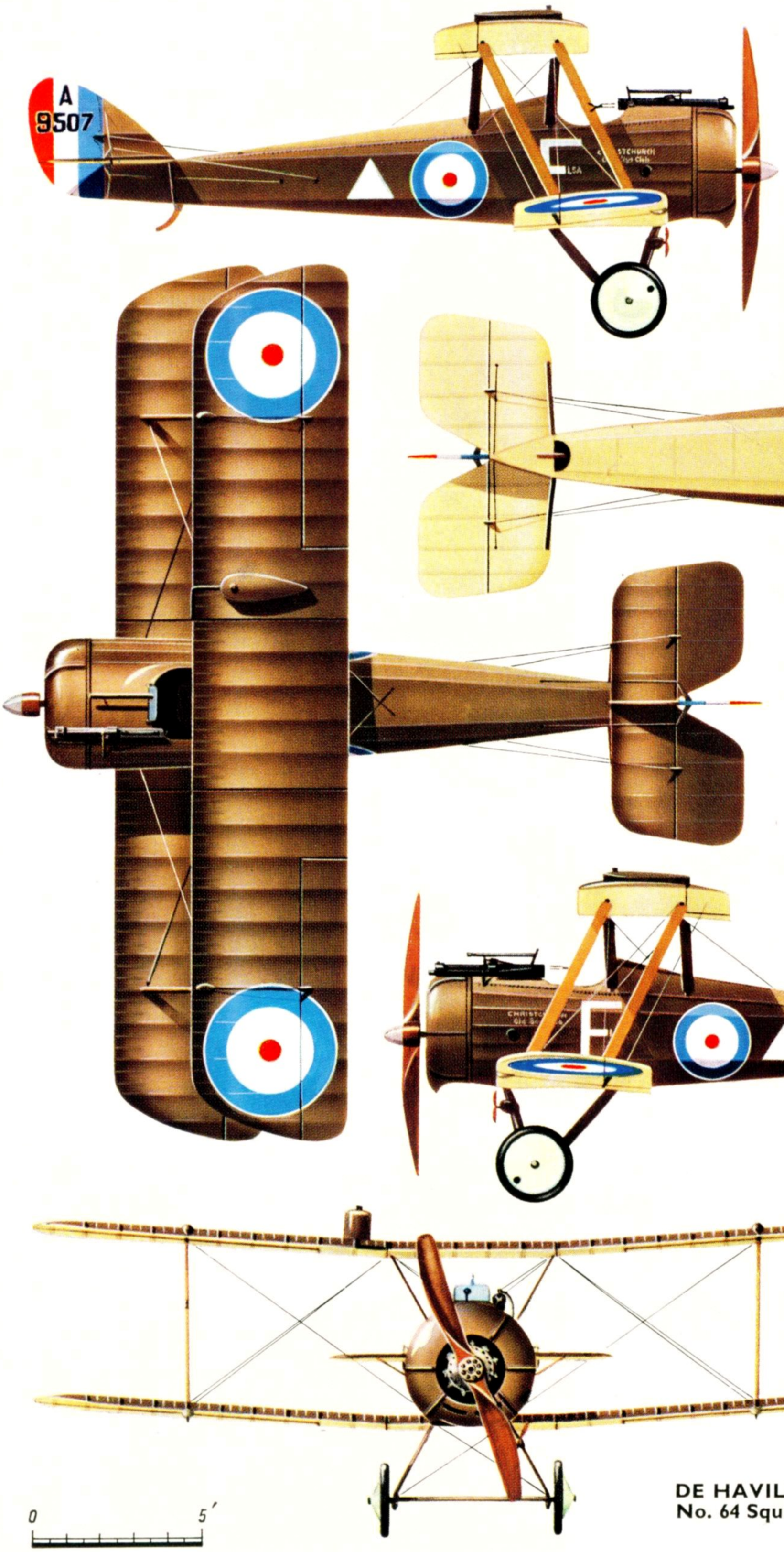

Fuselage marking detail.

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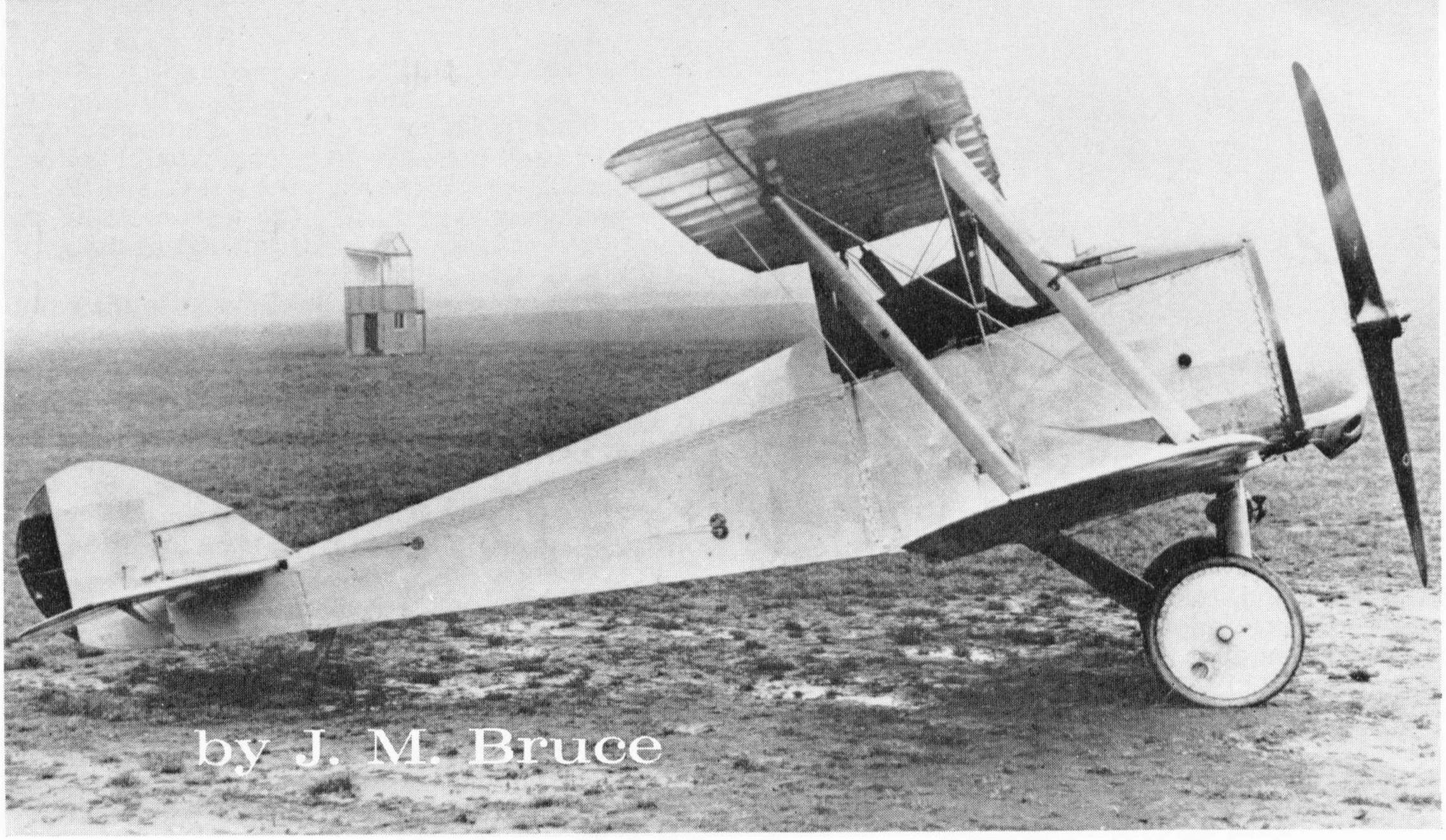
DE HAVILLAND D.H.5, *A9507*, aircraft 'E' of No. 64 Squadron, R.F.C.; France, 1917.



by J. M. Bruce

The De Havilland D.H.5

Following his work on the D.H.4 (see *Profile* No. 26) reconnaissance-bomber two-seater, Geoffrey de Havilland turned his attention to designing a new single-seat fighter. The D.H.2 (*Profile* No. 91) had, in its day, proved more than a match for the Fokker monoplane fighter (*Profile* No. 38), but its performance was limited by its pusher configuration. From his earlier experience with the B.S.1 and S.E.2 at the Royal Aircraft Factory, de Havilland knew well that the high performance that would be demanded of fighter aircraft could only be obtained with a clean tractor biplane, but he was equally aware that such an aircraft had critical blind spots.

In a radical attempt to combine the high performance of the tractor aircraft with the good forward view of the pusher, he designed the D.H.5 as a compact single-bay biplane with pronounced backwards stagger. This made it possible for the pilot's cockpit to be located under the leading edge of the upper mainplane, whence he had an uninterrupted forward and upward field of view.

The prototype emerged late in 1916, and the pilot on its manufacturer's trials, flown at Hendon, was B. C. Hucks. When it first appeared, the aircraft was unarmed. Its fuselage had flat sides abaft the wings and there were relatively short side fairings behind the circular engine cowling. The engine was a 110 h.p. Le Rhône 9J nine-cylinder rotary driving a two-blade airscrew. The fuselage tapered markedly to the tail, which incorporated a small fin and horn-balanced rudder. The single-bay wings were of equal span and chord and unusually long ailerons were fitted to upper and lower mainplanes. There was no spanwise balance cable: rubber bungee cord attached to the upper ailerons was employed to return the control surfaces to their normal position. At some time during its early existence the prototype was fitted with a small hemispherical spinner.

The early trials of the aircraft indicated inadequate directional control, consequently a new fin and rudder of greater area were fitted. These had a more elegant profile than the original surfaces, and enhanced the D.H.5's appearance. A single Vickers gun was also fitted on a remarkable mounting. Although synchronized to fire through the airscrew the gun could be elevated through an arc of about 60 degrees to fire upwards and forwards. This was clearly intended to enable the D.H.5 to attack enemy aircraft from below without loss of air speed, and it is somewhat ironic that a device of this kind was fitted to an aircraft that was to prove to have a limited operational ceiling and was to make such reputation as it acquired as a ground-attack aircraft.

With its new fin and rudder and Vickers gun mounted, the D.H.5 prototype was tested at Central Flying School on 9th December 1916. The reactions of the C.F.S. Testing Squadron pilots to the aircraft's startling configuration have not been recorded but the D.H.5's reverse stagger is not mentioned in the official report, which gave quite a favourable impression of the aircraft:

"*Stability*. Quite satisfactory. Lateral and longitudinal very good, directional fair.
Controllability. Quite satisfactory. Machine easy to land and to fly. Handy and quick in the air. Length of run to unstick 60 yards. To pull up with engine stopped 120 yards.
Tactical features. Vickers gun fired by pilot through the propeller and can be elevated to about 60° from the horizontal. Facilities for reconnaissance good. Machine is handy and quick in the air. The view forwards, upwards and downwards is very good.

(Above) *The D.H.5 prototype in its original form, photographed at Hendon.*

The prototype, still unarmed and with its original fin and rudder, but with a small spinner on the airscrew hub.

The view directly behind is badly masked by top plane. Designed as fighter only."

The D.H.5's performance at low altitudes was quite good, and its speed of 100 m.p.h. at 10,000 ft. was a distinct improvement over the D.H.2's 77 m.p.h. At the time when the prototype was tested, however, it was known that the Sopwith Pup's speed at that height was 104·5 m.p.h. on only 80 h.p.; that the Pup climbed to 10,000 ft. in 14 mins. 25 secs. whereas the D.H.5 prototype needed 16 mins. 18 secs.; and that the Pup's service ceiling was 17,500 ft. against the D.H.5's 14,300 ft.

As the Sopwith triplane (see *Profile* No. 73) could also exceed the D.H.5's performance in every material respect, the fact that the D.H.5 was ordered in substantial quantities becomes more than ever difficult to understand. Good though its flying qualities were, its poor climbing performance was an ill omen. One official document states that when the D.H.5 prototype was at C.F.S. it was fitted with a four-blade airscrew. If this is so it may have held down the engine r.p.m. and impaired the aircraft's performance.

Four hundred D.H.5s were ordered under two contracts that were dated 15th January 1917. Under Contract No. 87/A/1286, the Aircraft Manufacturing Co. were required to supply the prototype, to which the serial number *A5172* had been allotted, and 199 production aircraft, *A9163-A9361*. Contract No. 87/A/1358 was let with the Darracq company for *A9363-A9562*.

Quite extensive modifications were incorporated in the production D.H.5. A revised fuel system was fitted, an external feature of which was a five-gallon gravity tank mounted above the starboard upper wing: the main pressure tank, containing 21 gallons, was immediately behind the pilot's seat, and the oil tank was directly above it. The filler necks to the petrol and oil tanks were incorporated in the small head fairing behind the cockpit.

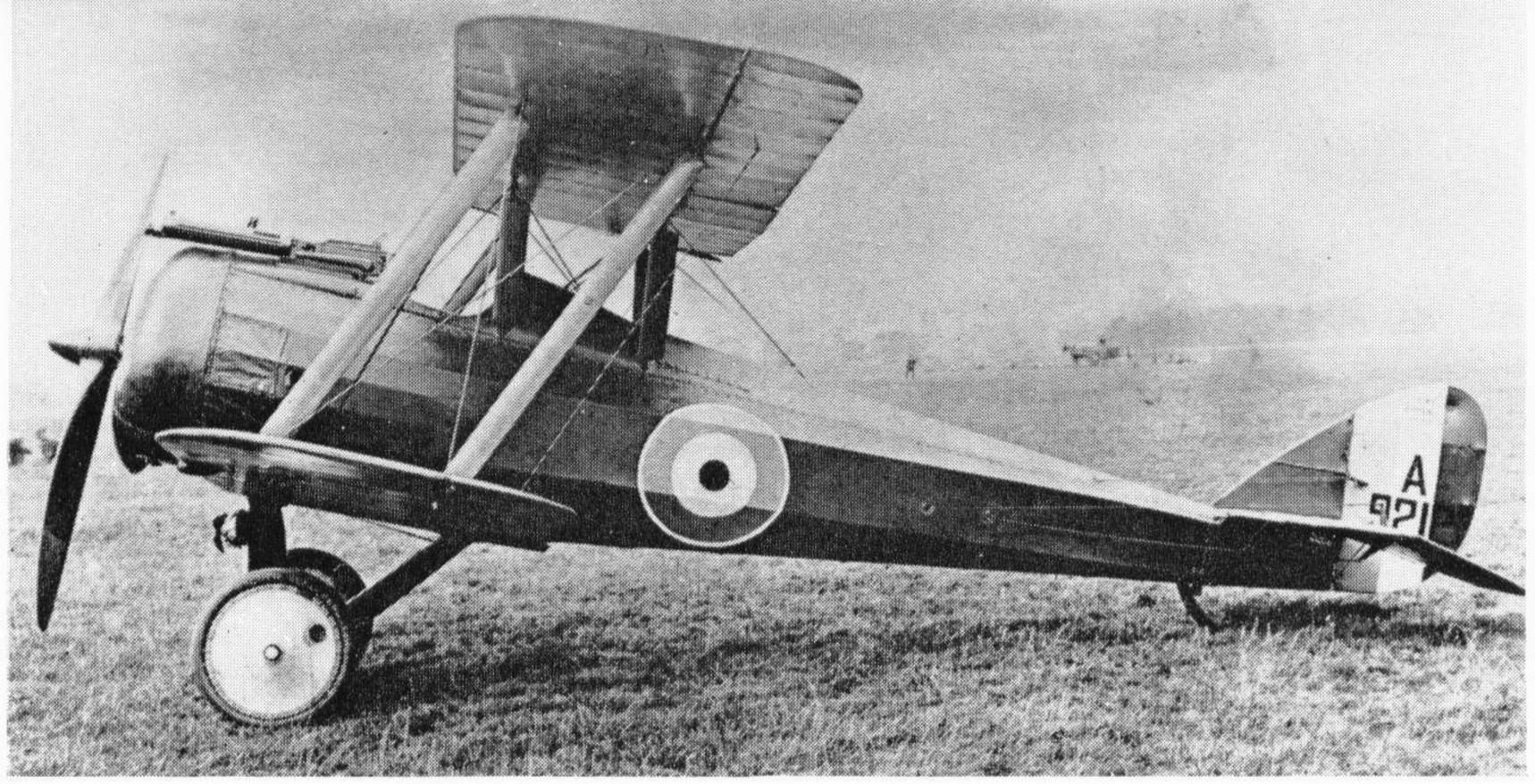
A modification that did much to alter the entire appearance of the D.H.5 was the major revision of its fuselage. Apparently the basic structure of longerons and spacers was not geometrically changed, but on to it was built an elaborate superstructure of plywood fairings and stringers that gave the entire fuselage an octagonal cross section. Additional stringers were fitted immediately behind the engine cowling to blend its circular outline into the main fuselage form. A small spinner was a standard fitting.

If the figures quoted in the performance table for the empty weights of the prototype and *A9186* are to be believed (they come from official reports), the addition of the fairings apparently added only 4 lb., suggesting that some modification may have been made to the basic structure. But it is possible that the removal of the gun-elevating mechanism provided a compensating saving in weight as between prototype and production aircraft.

The modified fuselage enhanced the D.H.5's appearance but must have made production more complex. The reason for the fairings is therefore difficult to discern, but it probably had the dual object of improving performance and improving the airflow over the tail surfaces. Directional control apparently was something of a problem on the D.H.5, for the vertical surfaces were again modified for the production aircraft: although these had the same outline as those of the modified prototype the rudder had no horn balance.

The basic fuselage structure was made in two parts that were butt-jointed at the attachment point of the rear centre-section struts. Geoffrey de Havilland made liberal use of plywood to ensure the rigidity of the structure: the forward portion of the fuselage had as side bracing large fretted panels of plywood, and the tail bays of the rear portion were similarly braced with fretted plywood. The remainder of the fuselage was a conventional wire-braced wooden box-girder.

The modified prototype with enlarged rudder, strut-braced tailplane, and Vickers gun on elevating mounting. The serial number A5172 *was carried on the rudder. The photograph was most probably made at Central Flying School while the D.H.5 was undergoing its official trials.* (Photo: I.W.M. Q.68244)



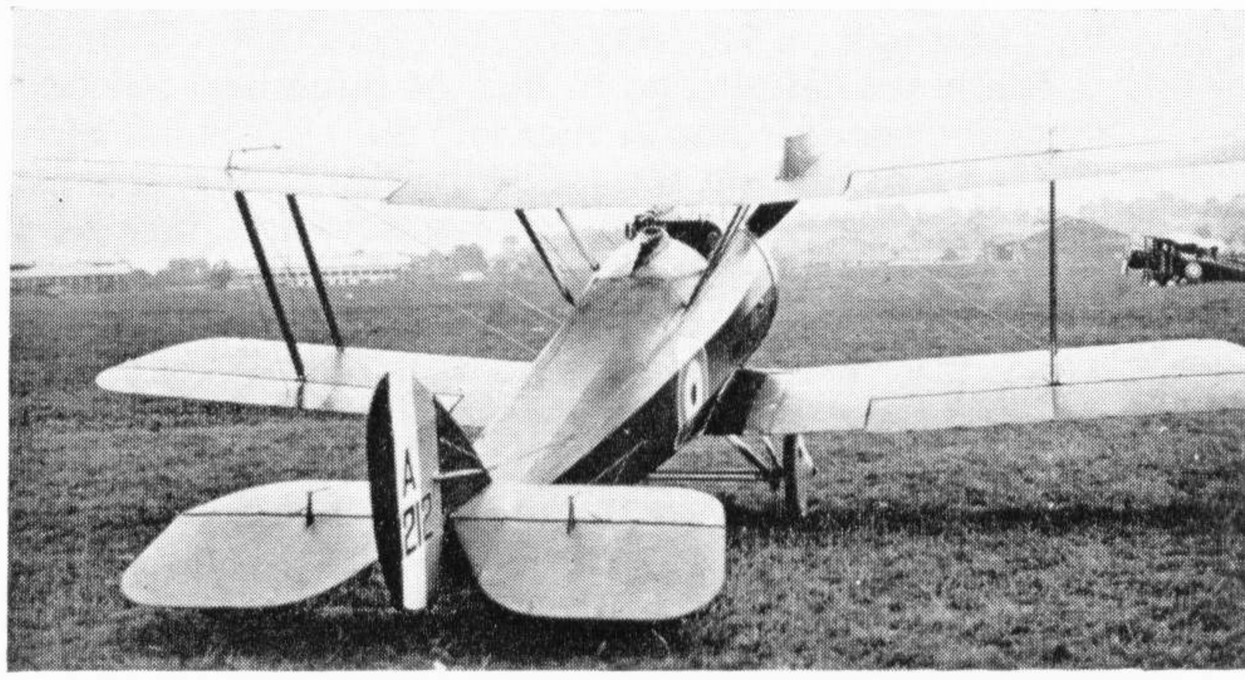
Standard early production D.H.5 built by the Aircraft Manufacturing Co. Ltd., with original engine cowling and rubber-cord return springs on upper ailerons. The aircraft was photographed at Hendon.

The flight surfaces were conventional cross-braced wooden structures and retained the remarkably long ailerons on upper and lower wings. Many D.H.5s left the factory with rubber bungee return springs on the ailerons, but later a system of pulleys and spanwise balance cable was fitted. Covering was of fabric throughout.

Possibly the most outstanding characteristic of the D.H.5 was its structural strength. A specimen airframe was tested to destruction in April 1917, when the load factor on the mainplane under flight loading proved to be 7·46. Failure occurred, not in the major structural members, but in the bolts holding the wiring plates for the forward flying wires. With the elevators loaded at 28 lb./sq. ft. the surfaces did not collapse: instead, the control column broke in its socket at the bolt that was clamping it for the purposes of the test. The elevator cables were then attached direct to the airframe and the test continued. Not until the loading was increased to 32 lb./sq. ft. did the control horns on the elevators break the ribs to which they were attached. The remainder of the airframe proved to be equally strong.

Hence Oliver Stewart's epitome of the D.H.5 in *The Clouds Remember:*

"This aeroplane could dive. That might be written in memory of the D.H.5. It may have been



because of its backward stagger or for some other aerodynamic reason, or it may have been for some optical reason; but it is certain that the sight of a formation of D.H.5s going down on an enemy formation was one of the most impressive things of the air war. They appeared to stand vertically on their noses and to fall out of the sky like a flight of bombs."

Apart from its mediocre performance the D.H.5 suffered from the further disadvantage of being late in reaching the front. The Aircraft Manufacturing Co.'s Hendon factory was, of course, heavily com-

The first Darracq-built D.H.5, A9363, *photographed at Farnborough where it was inspected on 9th May 1917. It was later used in France by No. 24 Squadron, R.F.C.* (Photo: I.W.M. MH3248)

A9435 of No. 24 Squadron was captured intact by the Germans and is here seen at Adlershof. This aircraft had the stiffened engine cowling and full-span aileron balance cables in place of the earlier rubber-bungee return springs.

mitted to production of the important D.H.4, and the first Darracq-built D.H.5 did not emerge until the beginning of May 1917. It was reported to be at Farnborough on 9th May.

The first D.H.5 to go to No. 24 Squadron reached that unit's aerodrome at Flez at 5.30 p.m. on 1st May 1917, the second on the following day. New aircraft must have been slow in coming forward, however, for the squadron still had a few D.H.2s on 7th June, when the Battle of Messines began. No. 32 Squadron, which was also re-equipping with D.H.5s, similarly still had some D.H.2s on its strength on that date.

No. 24 Squadron's first victory with the D.H.5 came on 25th May 1917, when 2nd Lieutenant S. Cockerell shot down an enemy aircraft that was seen to crash. The squadron history lists only nineteen more claims while equipped with D.H.5s; of these only two were enemy aircraft seen to crash and of the seventeen logged as "out of control" it seems that only five were confirmed. Leading scorers were Captain B. P. G. Beanlands, M.C. (four out of control, three of them confirmed), Capt. H. W. Woollett, D.S.O., M.C., whose final victory score was 35 (one crashed, two out of control of which one was confirmed), and 2nd Lieutenant I. D. R. McDonald, M.C., D.F.C. (one crashed, three out of control, of which one was confirmed). McDonald's final score was 20.

Of the D.H.5, No. 24 Squadron's historian lamented:

> "Unfortunately the new machine was a failure, and it must be recorded that despite every effort on the part of the pilots, success in any way comparable with their early efforts and results was postponed until late in the year."

Apart from its other disadvantages the D.H.5's highly unconventional appearance aroused the instant distrust of R.F.C. pilots. Oliver Stewart wrote:

> "Few aeroplanes have been subjected to so much adverse criticism among pilots as the D.H.5. A good many accidents happened when pilots were being trained to fly this machine, and it acquired the reputation of "losing" its elevator control if the gliding speed were allowed to fall to anything closely approaching the landing speed of about 50 m.p.h. Partly, perhaps, on this account it was never used extensively for low aerobatics. Pilots made it do all the normal aerobatics, but it was not chosen for advanced developments like the Camel."

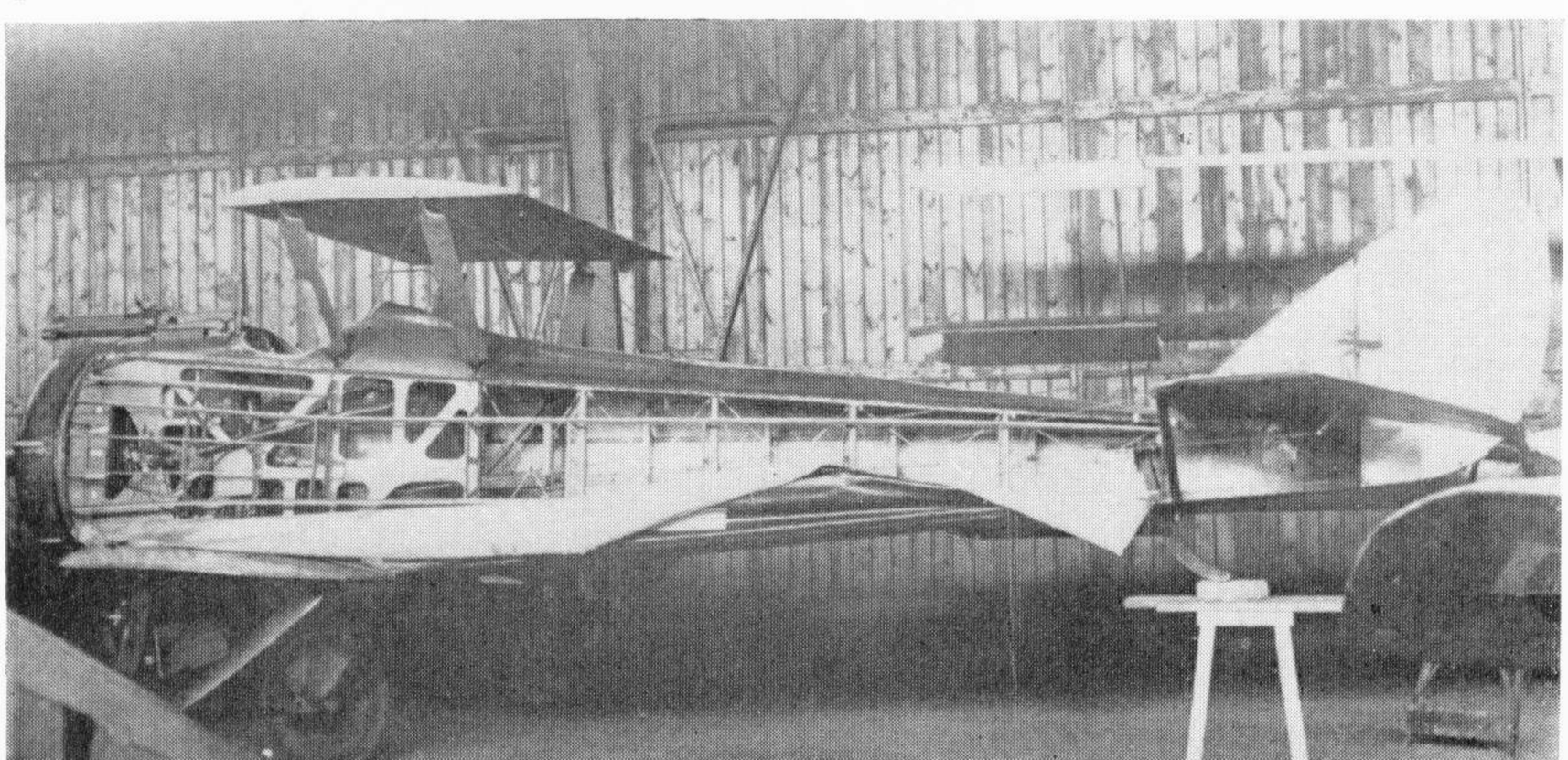
The adverse criticism of the D.H.5 was to some extent based on rumour and imagination rather than on fact. This is demonstrated in the following extract from an article by Captain J. E. Doyle, D.F.C., that was published in the inter-war magazine *Air Stories*. It also illustrates some of the hazards that attended the flying of aircraft fitted with rotary engine and pressure petrol tanks:

> "The D.H.5 Scout had just come into production. It was something of a freak as it had backward stagger, the upper plane being set behind the lower. This was said to have been ordered by the Air Staff against the advice of the makers. The De Havilland (*sic*) company's objection was that when such a machine came near to stalling point and started to sink rather than fly, the lower plane would blanket the upper one and cause a sudden drop.

As a result of its unconventional design, the D.H.5 became the subject of an extra large crop of rumours. It was said to stall at 80 m.p.h., viciously and without warning. At that time I was instructing in Norfolk, where none of us had even seen a D.H.5, and it was with no noticeable pleasure that I received orders to go to Lincoln and fetch one. Nor was I in any way reassured by the special injunction that I was not to try and fly it at less than 90 m.p.h.

Arrived at Lincoln, I found that, because of the wind, I must take the machine off from the racecourse across its rather inadequate width instead of down its length. I judged I could just manage it in time to clear some fir trees that lined the course. The Le Rhône started up and I blipped it on the thumb-switch while I found the setting for full throttle. Then I ran the engine up, waved away the chocks and went charging across the grass.

Those trees fairly rushed at me, but I was soon



With the fabric unlaced, A9435 here displays the fretted plywood panels of the forward fuselage that contributed to the D.H.5's great structural strength.
(Photo: Egon Krueger)

The D.H.5s of the batch B331-B380 *built by British Caudron were distinguished by the unusual style of lettering used in the presentation of their serial numbers. The characters had angular corners, much as in the standard letters and numerals used on American aircraft at the present time. The Caudron-built D.H.5s were probably unique among contemporary British aircraft in having lettering of this kind applied at the factory. This D.H.5 was a presentation aircraft and bears on its fuselage side the inscription "Presented by the Solanki Princes, Chiefs and Nobles."*

level with their tops. Then the engine cut out. The symptoms suggested too much petrol, so I flicked the fine adjustment back and waited. The tank pressure was supplied by a wind-driven pump, with an automatic release valve, and I guessed that this had been faultily adjusted so that pressure had soared too high. The engine quickly cleared itself, fired a burst and then banged in the crankcase, denoting petrol shortage. Instantly I had the fine adjustment forward to a fresh setting, and just managed to skim over those trees with inches to spare. Fortunately for me, the D.H.5's stalling tendency had been exaggerated, and on the flight home I found it a most comfortable and pleasant machine to fly, extremely sensitive to aileron control."

The belief that the D.H.5 was put into service against its designer's wishes seems to have been quite widely held. It appears in the following extract from an article published in the January 1938 issue of the magazine *Popular Flying;* the author was James A. V. Boddy, one of the original members of No. 64 Squadron, R.F.C.:

"Known familiarly as de Havilland's "fifth effort" it was by no means his most successful, and rumour had it that it was put into service against the designer's wish. The fact that it was withdrawn after only a few months' service rather supported this view. An unfortunate tendency to shed its wings when stunted, and also the tappet-rods of its English-made Le Rhône when over Hunland, didn't inspire us with a great deal of confidence."

That passage also provides an example of the kind of rumour that grew up around the type. The aircraft's strength of structure was so great that a D.H.5 would be extremely unlikely to shed its wings unless it had been badly built, badly maintained or grossly mishandled.

By the time the Battles of Ypres began on 31st July 1917 the D.H.5s then in France had not distinguished themselves in air combat. A third D.H.5 squadron was operational by that time, No. 41 Squadron having exchanged its F.E.8s for the new type shortly before the Ypres operations began.

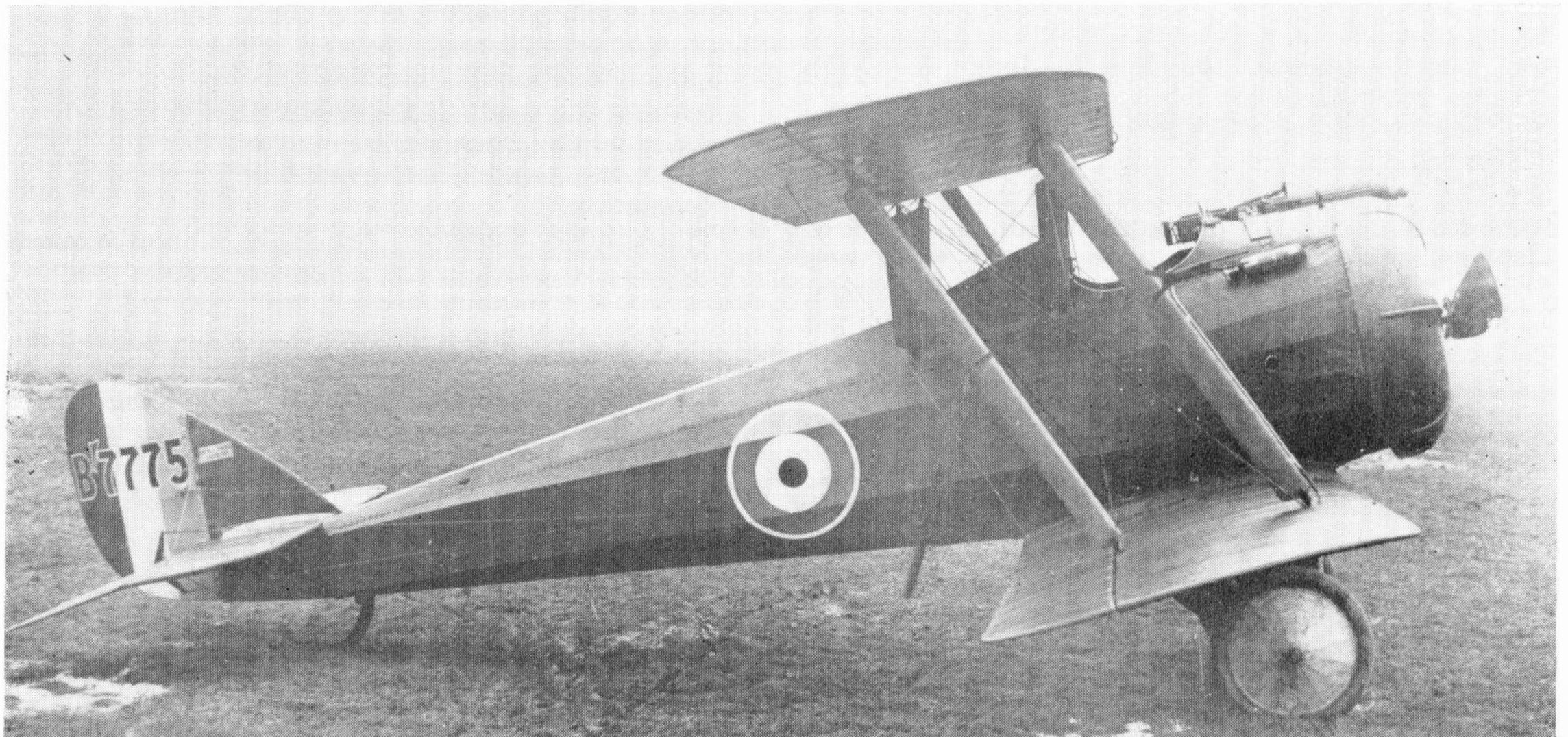
Ypres was the first major battle in which ground-attack work by aircraft was co-ordinated with the infantry advance. For the attack launched on 16th August two D.H.5s were allotted to each divisional front for the specific purpose of assisting the infantry in their attack on the final objective.

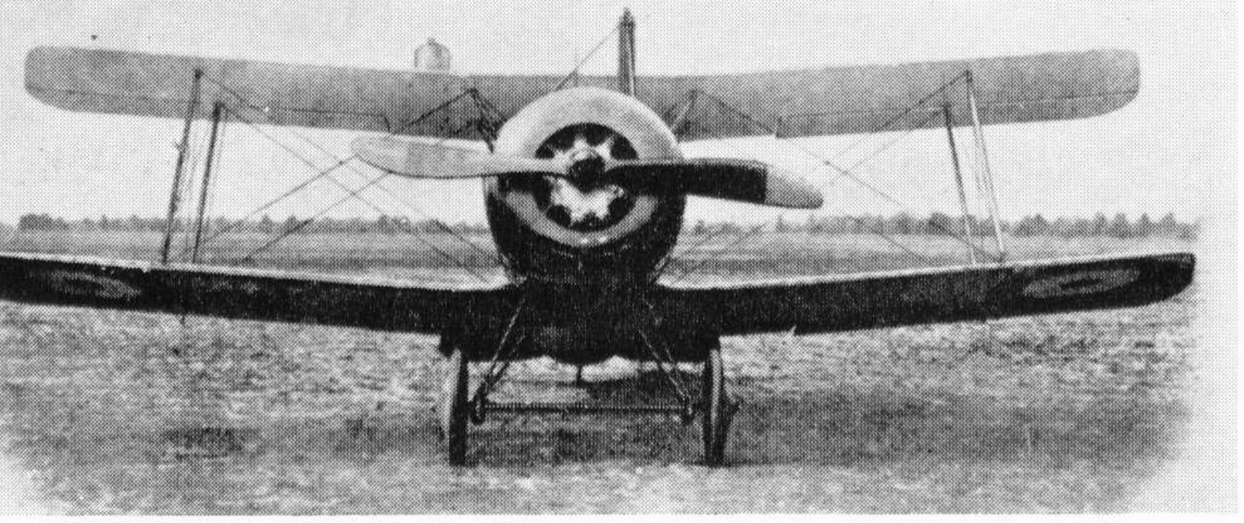
"The pilots were to patrol at a low height short of the barrage, and were to attack any enemy strong-points which appeared to hold up the infantry advance."*

So confused was the ground fighting that the idea was only partly successful, a disappointment after the earlier successful action by three D.H.5s of No. 41 Squadron at Boiry Notre Dame on 9th August.

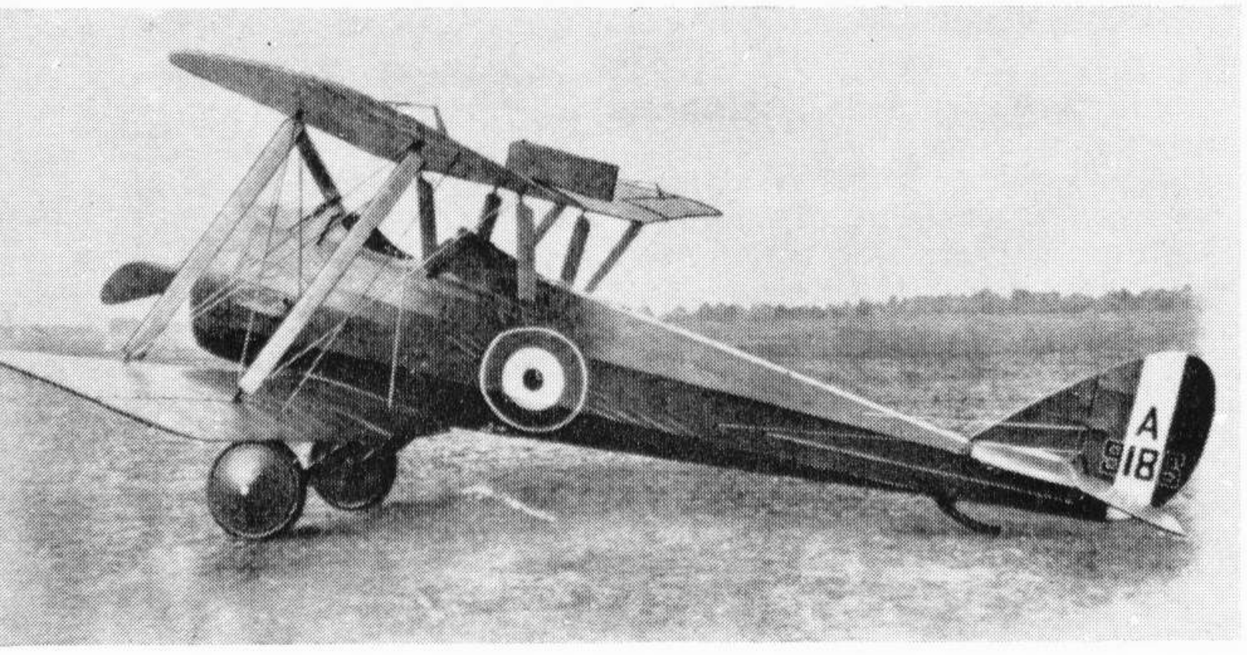
* The War in the Air, *Vol. IV. p. 176*

One of the very few D.H.5s rebuilt by No. 1 (Southern) Aeroplane Repair Depot, Farnborough, was B7775. It had a Pyrene fire extinguisher carried externally just ahead of the cockpit on the starboard side. (Photo: I.W.M. Q67106)





A9186 *with its Vickers gun fixed to fire at an upward angle of 45 degrees.*



On the 19th, however, fourteen D.H.5s (five of No. 41 Squadron, nine of No. 24), four F.E.2b's of No. 18 Squadron and five S.E.5a's of No. 60 Squadron fired a total of 9,000 rounds into enemy positions south of Vendhuille and assisted materially the advance of the infantry. A week later twelve D.H.5s of Nos. 24 and 41 Squadrons attacked German infantry and transport during the action against Cologne Farm Hill.

The great strength of the D.H.5 and the superb forward view it gave its pilot made it an ideal aircraft for trench-strafing; but it carried no armour plate and casualties were high. The losses of low-flying aircraft of all types were as great as 30 per cent. on the days when they made organized attacks during the Battle of Cambrai.

These early successes in the ground-attack rôle may have been the reason underlying Contract 87/A/1714 which was dated as late as 23rd August 1917 and was for 100 D.H.5s (*B4901-B5000*) to be built by March, Jones & Cribb of Leeds. And yet this contract remains a mystery, for the expected rate of delivery was only four aircraft per week. This would have meant that the last deliveries would be made in the spring of 1918. It is doubtful whether this contract was ever completed, for March, Jones & Cribb became contractors for the more effective Camel; but their production of D.H.5s ran to *B4924* at least.

Normal combat-patrol flying by D.H.5s continued, and they participated in the long-range sweeps that were made during the preparations for the Battle of Cambrai. According to the official history these were

> ". . . . made by large formations of Bristol Fighters, Sopwith Pups and D.H.5s, disposed in stepped layers, the Pups about 15,000 ft., the Bristols 3,000 ft. lower, and the D.H.5s 3,000 ft. lower again. The formations were planned so that each type of aeroplane was used at the altitude to which it was best suited with each type complementary to the other."*

The final sentence of that quotation is significant. The D.H.5, introduced into service a full eight months after the Pup, was so inferior to the little Sopwith that it had to be limited to a combat altitude of a mere 9,000 ft.

In other respects, too, the D.H.5 left much to be desired, as the pilots of No. 68 (Australian) Squadron found during their earliest attempts at combat. This unit reached France, equipped with D.H.5s, on 21st September 1917, having flown as a complete squadron from its training base at Harlaxton to St. Omer in one day. On 2nd October four of No. 68 Squadron's D.H.5s saw an enemy two-seater below them near St. Quentin. They promptly dived on it, but

> "The German made for the ground, and the D.H.5s had to abandon the chase, the German having the speed of them. A quarter of an hour later they met another two-seater, which Lieutenants L. H. Holden and R. W. Howard attacked; but this too escaped by superior speed."†

Clearly, enemy two-seaters that could outstrip the D.H.5 had little to fear from it.

But if its combat successes were few, the D.H.5 won, through its ground-attack work, a modest share of what by the distorted standards of war passes for glory. That this was its *forte* and martial trade was recognised in the training of No. 64 Squadron which, before leaving England in October 1917, had practised low-flying across country. After the unit's arrival in France on 14th October this practice continued and, according to the official history, this was done in formation. What possible application there could have been for low-flying in formation in the fighting conditions of 1917 is impossible to imagine. Certainly the squadron did not use this technique on 20th November 1917, when the British advance was being checked at Flesquières.

> "Four D.H.5s of No. 64 Squadron arrived over Flesquières at 7 a.m. and found the German batteries fully active, the guns being still in their pits. The pilots bombed the gun-pits, with their 25 lb. bombs, scoring at least one direct hit, and expended their ammunition against the gun-detachments. One group of gunners, who ran for shelter to a house, got jammed in the doorway and, immovable, were riddled by the bullets of the leader of the D.H.5s. One of the pilots had a stoppage in his machine-gun and had flown some distance eastwards before he had rectified the stoppage. He turned back toward Flesquières, but when he came over the German battery positions again at 7-45 a.m. he could find no activity of guns or personnel. Several corpses of men were lying near the pits, and dead horses and a limber were on the road. It is possible that in the interim the guns had been pulled out and that the earlier low-flying attacks had caused or accelerated this precaution."‡

Throughout Cambrai the D.H.5s and Camels continued to provide the airborne mobile machine guns that the infantry needed, with enormous losses of aircraft and pilots. When the Germans counter-attacked on 30th November they too employed ground-attack aircraft and the air over the battle was thick with low-flying aircraft of several types, their trench-strafing activities being punctuated by brief air combats.

Replacement of the D.H.5 had in fact begun shortly before the Battle of Cambrai. Even as No. 64

*The War in the Air, *Vol. IV, p. 232.*

†Official History of Australia in the War of 1918: Vol. VIII, Australian Flying Corps, *by F. M. Cutlack.*

‡The War in the Air, *Vol. IV, pp. 235-236.*

Squadron was bringing its D.H.5s to the front in October 1917, No. 41 Squadron was re-equipping with S.E.5a's. Squadrons Nos. 24, 32 and 68 were also re-equipped with S.E.5a's in December 1917, the historian of No. 24 recording the event in these significant words:

> "On December 25th the Squadron received the best of all Xmas presents—a new machine—and both pilots and mechanics heaved a sigh of thankfulness to heaven. The new machine was the S.E.5 (*sic*), with 200 h.p. Hispano-Suiza engine. It was a beautiful aeroplane with a splendid performance, and was considerably better than any machine possessed by the enemy at that time with, perhaps, the exception of the Fokker triplane scout, which had recently made its appearance, and was always a dangerous opponent on account of its climb and manoeuvrability."

By the end of January 1918 the D.H.5 was no longer in operational use. It had been withdrawn from the western front and was not used in any other theatre of war. The type was not used on Home Defence duties, but an experimental gun mounting in *A9186* suggests that this might have been considered. This D.H.5 was tested in July 1917 with its Vickers gun fixed at an upward angle of 45 degrees. The installation was probably a consequence of the experiments at Orfordness that showed that bullets fired from a gun mounted at that angle on an aircraft flying at 100 m.p.h. maintained a straight trajectory for 800 yards. Significant thought this discovery was at a time when Home Defence aircraft were likely to be obliged to attack enemy airships from below, its application on Home Defence Bristol F.2Bs (see *Profile* No. 21, page 4) secured no recorded victory. Certainly the D.H.5, with its low ceiling and poor rate of climb at altitude, was no vehicle for a weapon installation intended for this kind of use, and there is no known record of any development of *A9186* and its gun.

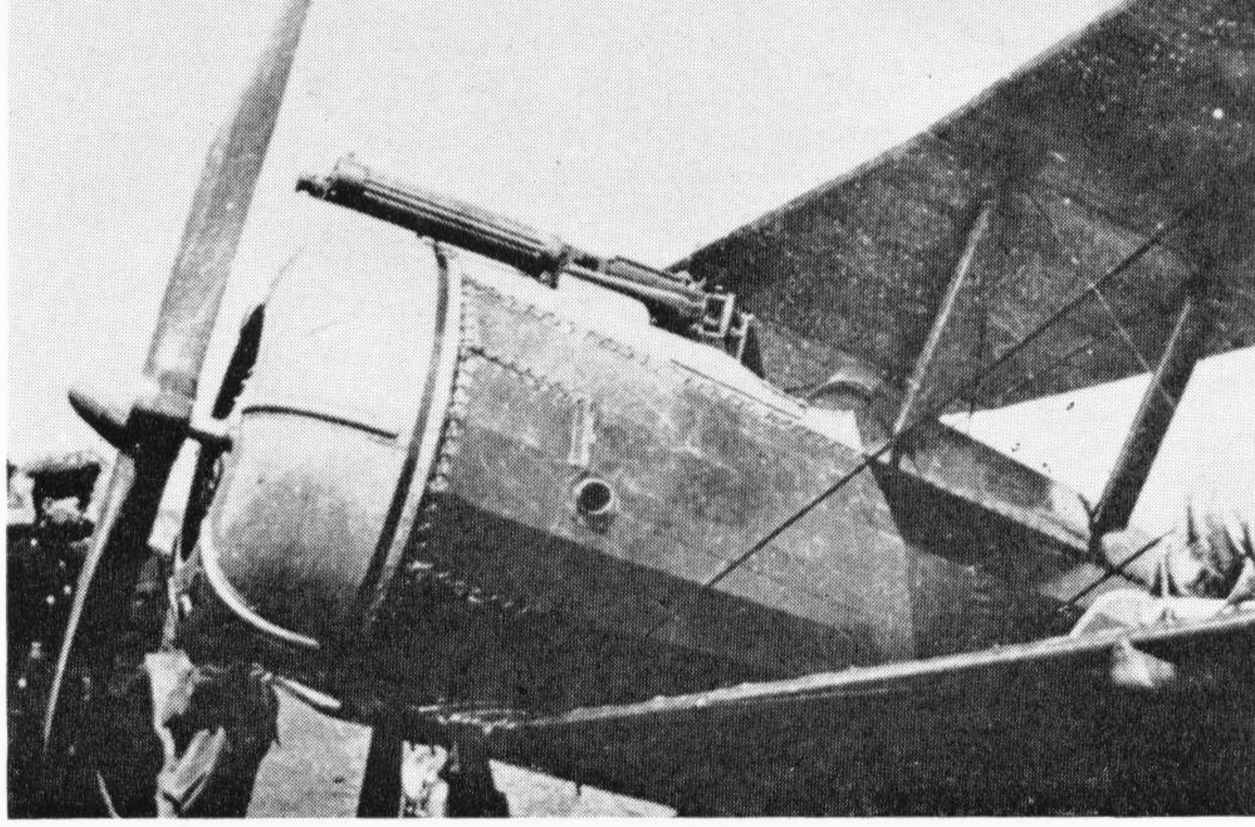
The performance tests of this aircraft were done at Martlesham Heath and, odd as it may seem, the results recorded have always been published as the standard performance figures for the D.H.5.

Another inconclusive experiment on a D.H.5 was conducted at the Royal Aircraft Factory, Farnborough, in the summer of 1917. On 12th July 1917, *A9403* fitted with the 110 h.p. Le Rhône No. 100945/W.D. 9028, was delivered to the R.A.F. Possibly as an augury of what was to come, the aircraft had apparently been expected a week earlier but had made a forced landing at Leatherhead on 5th July. It was intended to use this aircraft for tests of plywood fuselage covering and of the jettisonable petrol tank designed by Lt. Lloyd Lott.

Before the necessary modifications were made the aircraft was tested in its standard form to provide comparative performance figures. However, the official report (dated 18th October 1917) bewails the fact that the D.H.5's engine was continually unsatisfactory: "engine trouble was experienced from the beginning, particularly in starting and slow running".

After preliminary trials on 9th and 13th August *A9403*'s fuselage was covered with plywood and the Lott tank installed. On the flying tests of this combination

> ". . . the engine starting became so troublesome that a complete overhaul was made. Oleo plugs were fitted; the H.L. magneto was replaced by a Bosch; the exhaust valves were retimed to open 10° earlier and close 70° later on the average; the inlet valves to open 4° later and close 4° earlier. These modifications resulted in an improvement in the starting and slow running and the engine revolutions on the ground were approximately the same as before the alterations."



Close-up of the nose of a D.H.5, showing the stiffening ribs on the engine cowling. In this aircraft the hydraulic lead from the Constantinesco synchronizing gear was taken up to the rear of the gun; other D.H.5s had this lead brought round the port side of the gun.

A lugubrious footnote to the report adds that the intense vibration in the cockpit of the aircraft made it almost impossible to take accurate readings of any instrument. It is possible that Treasury penny-wisdom had ensured that the Royal Aircraft Factory had no spare Le Rhône engine at that time, for the solution so clearly lay in fitting a different engine that one wonders why this was not done and many valuable man-hours saved.

The performance of the ply-covered D.H.5 was much worse than that of the standard aircraft, but the report points out that the change in the aircraft's external shape was so small that it alone could not be responsible for the increase of 30 per cent. in the time taken to climb to 10,000 ft. The summary of the report stated tersely:

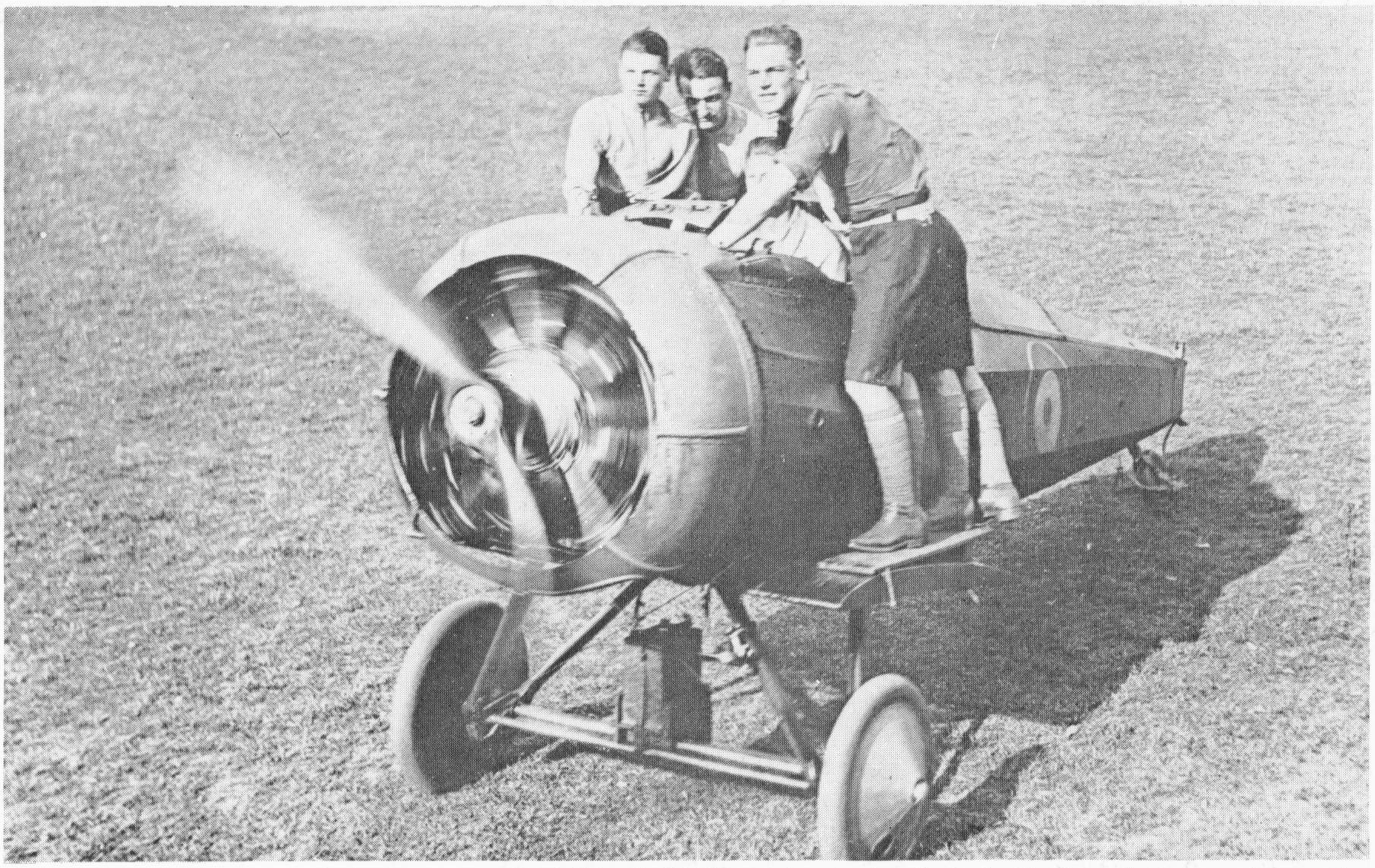
> "The running of the engine in this machine has been so unsatisfactory that no definite conclusions can be drawn as to the effect of the three-ply covering on the performance."

From Farnborough *A9403* was sent to Orfordness for tests of the Lott tank. This was held in place by a quick-release device and its ejection from the fuselage was accelerated by two lengths of shock-absorber rubber cord stretched over the top of the tank. The Orfordness test was made in November 1917 and was a static one, the D.H.5 being suspended from a derrick over water. The tank, when fired at with a mixture of ball and incendiary ammunition, ignited at the second shot, but the jettisoning mechanism functioned well and the tank was ejected into the water below.

The engine in *A9403* must have been an unusually poor Le Rhône. That engine remained the standard power unit of the D.H.5 throughout its operational career, but individual aircraft are known to have been fitted with the 110 h.p. Clerget and 100 h.p. Gnome Monosoupape engines. These were probably "home-made" conversions at training units.

No-one regretted the passing of the D.H.5. It was a bold experiment but it proved, perhaps more than any contemporary type, that in balancing pilot's

A9340 *on display in Trafalgar Square in March 1918 during the Y.M.C.A. Blue Triangle Week. The aircraft seems to have been something of a lash-up for this occasion: the lower starboard wing has a roundel on its upper surface and must originally have been an upper wing on another D.H.5; and the underwing aileron control cables are slack. The markings are those of No. 32 Squadron, R.F.C., but the authenticity of the individual letter C is questionable.* (Photos: Flight International 33 and 34)



A D.H.5 fuselage in use as a taxiing trainer at No. 2 School of Military Aeronautics, Oxford. The frontal aperture of the cowling has been enlarged to aid cooling of the engine. (Photo: I.W.M. Q27249)

view and fighting performance certain sacrifices of one quality or the other had to be made. It was the D.H.5's misfortune that it suffered in performance. It deserves to be remembered for the effective but costly ground-attack work it did at Cambrai.

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The author acknowledges gratefully the contribution made to this history by Mr. L. A. Rogers.

SPECIFICATION

Power: Standard power unit was the 110 h.p. Le Rhône 9J, but one or two D.H.5s had the 110 h.p. Clerget 9Z or 100 h.p. Gnome Monosoupape.
Dimensions: Span 25 ft. 8 in.; length 22 ft.; height 9 ft. 1½ in.; chord 4 ft. 6 in.; gap 4 ft. 10 in.; stagger (negative) 2 ft. 3 in.; dihedral 4 deg. 30 min.; incidence 2 deg., washing in to 2 deg. 15 min. at port interplane struts; span of tail 8 ft. 4½ in.; airscrew diameter (Lang 1708) 8 ft. 6½ in.; wheel track 5 ft.; tyres 700×75 mm.
Areas: Wings 212·1 sq. ft.; ailerons, each 11.6 sq. ft., total 46·4 sq. ft.; tailplane 13·4 sq. ft.; elevators 12·2 sq. ft.; fin 2·2 sq. ft.; rudder 6·3 sq. ft.
Armament: One 0·303 in. fixed Vickers machine gun synchronized by Constantinesco C.C. gear. Loading handle: Cox's D Type. Sights: Aldis, ring and bead. Four 25 lb. Cooper bombs on rack under the fuselage.

PRODUCTION

A total of 550 D.H.5s, including the prototype, were ordered but it is uncertain whether all were completed. Manufacturers and their contracts were as follows:
The Aircraft Manufacturing Co., Ltd., Hendon, London, N.W.: A5172, A9163-A9361.
British Caudron Co., Ltd., Broadway, Cricklewood, London, N.W.2: B331-B380.
The Darracq Motor Engineering Co., Ltd., Townmead Road, Fulham, London, S.W.6: A9363-A9562.
March, Jones & Cribb, Leeds: B4901-B5000.
Aircraft rebuilt by Aeroplane Repair Depots: B7775 (by No. 1 (Southern) A.R.D., Farnborough, Hants.).

SERVICE USE

Western Front: R.F.C. Squadrons Nos. 24, 32, 41, 64 and 68 (Australian).
Training: Schools of Aerial Fighting at Freiston, Marske, Sedgeford and Turnberry; Advanced Air Fighting School, Lympne; No. 40 Reserve Squadron, Croydon.

EXAMPLES OF D.H.5s USED BY R.F.C. UNITS

No. 24 Sqn.:— *A9165, A9166, A9167, A9175, A9176, A9178, A9182, A9183, A9220, A9272, A9291, A9329, A9363, A9431, A9435* (Aircraft "E"), *A9448, A9471, A9496, A9514, B334, B341, B348, B349, B359.*
No. 32 Sqn.:— *A9179, A9207, A9300, A9311, A9315, A9340* (Aircraft "C"), *A9374, A9404, A9422, A9439, B345, B4914, B4916, B4924.*
No. 41 Sqn.:— *A9168, A9196, A9208, A9218, A9225, A9241, A9408, A9410, A9440, A9444, B340.*
No. 64 Sqn.:— *A9177* (Aircraft "A"), *A9299, A9458, A9507* ("E").
No. 68 Sqn.:— *A9224, A9226, A9242, A9245, A9263, A9265, A9271, A9273, A9283, A9284, A9288, A9428, A9449* ("1"), *A9459, A9462, A9464, A9469, A9473, A9542* ("Z"), *B377.*
No. 40 Reserve Squadron, Croydon:— *A9163, A9266, A9377, A9452, B373.*

WEIGHTS AND PERFORMANCE

Aircraft	Prototype A5172	A9186	A9403	
			In standard condition	With ply-covered fuselage
Engine	110 h.p. Le Rhône	110 h.p. Le Rhône No. 9107/8007/W.D. 10609	110 h.p. Le Rhône No. 100945/W.D. 9028	
Weights (lb.)				
Empty	1,006	1,010	985	1,020
Military load	80	80	40	25
Pilot	180	180	180	160
Fuel and oil	222	222	225	225
Loaded	1,488	1,492	1,430	1,430
Max. speed (m.p.h.)				
at 6,500 ft.	104	—	—	—
at 10,000 ft.	100	102	104	97
at 15,000 ft.	—	89	—	—
Climb to	m. s.	m. s.	m. s.	m. s.
5,000 ft.	5 42	— —	4 55	6 20
6,500 ft.	8 20	6 55	— —	— —
10,000 ft.	16 18	12 25	14 15	18 50
15,000 ft.	— —	27 30	— —	— —
Service ceiling (ft.)	14,000	16,000	—	—
Endurance (hours)	3	2¾	—	—

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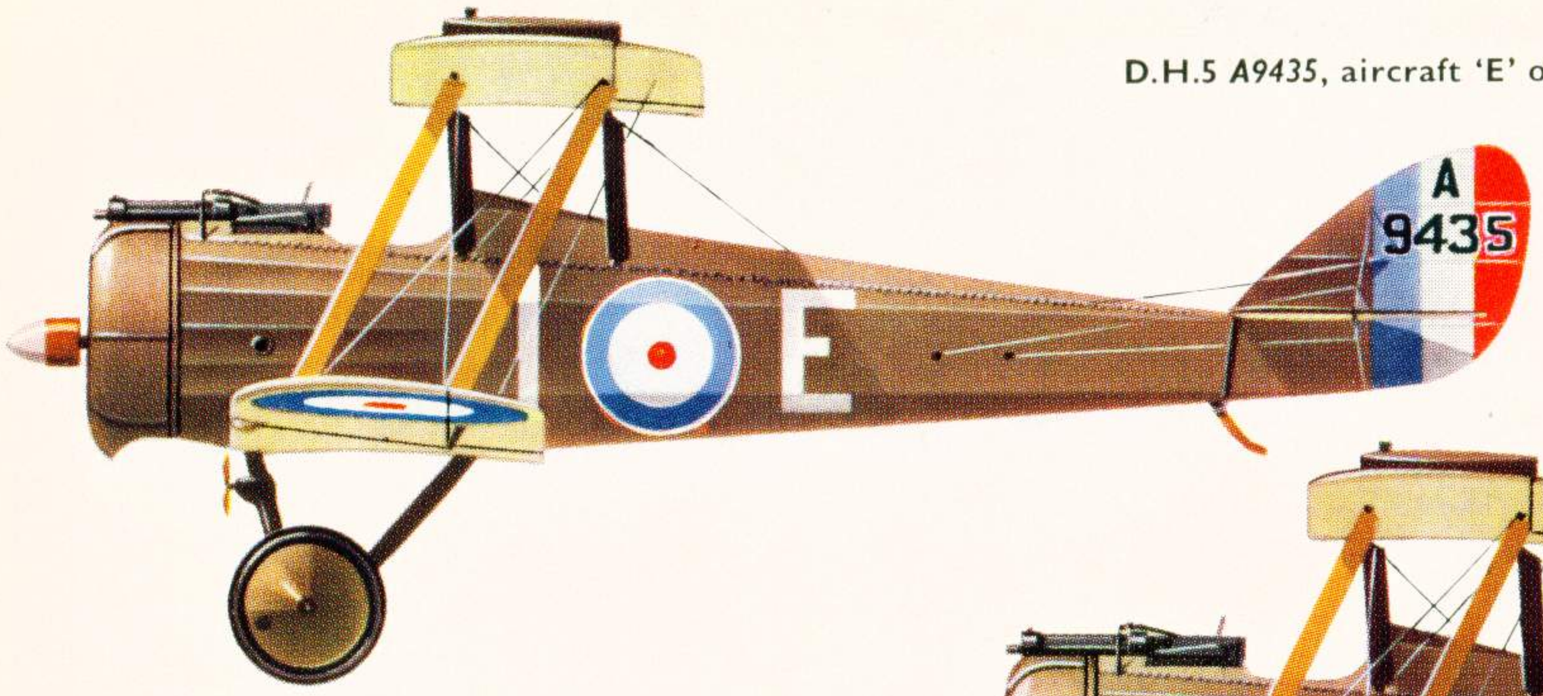
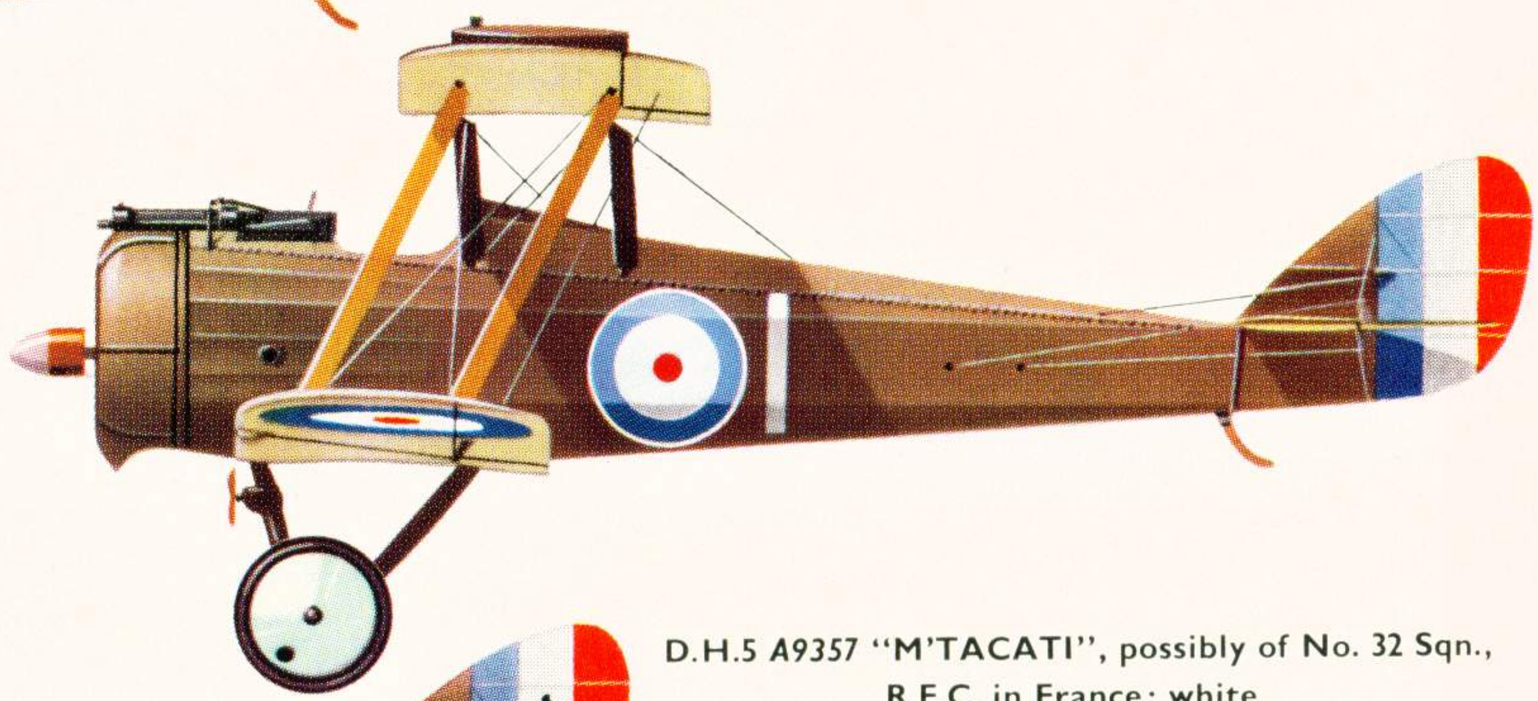
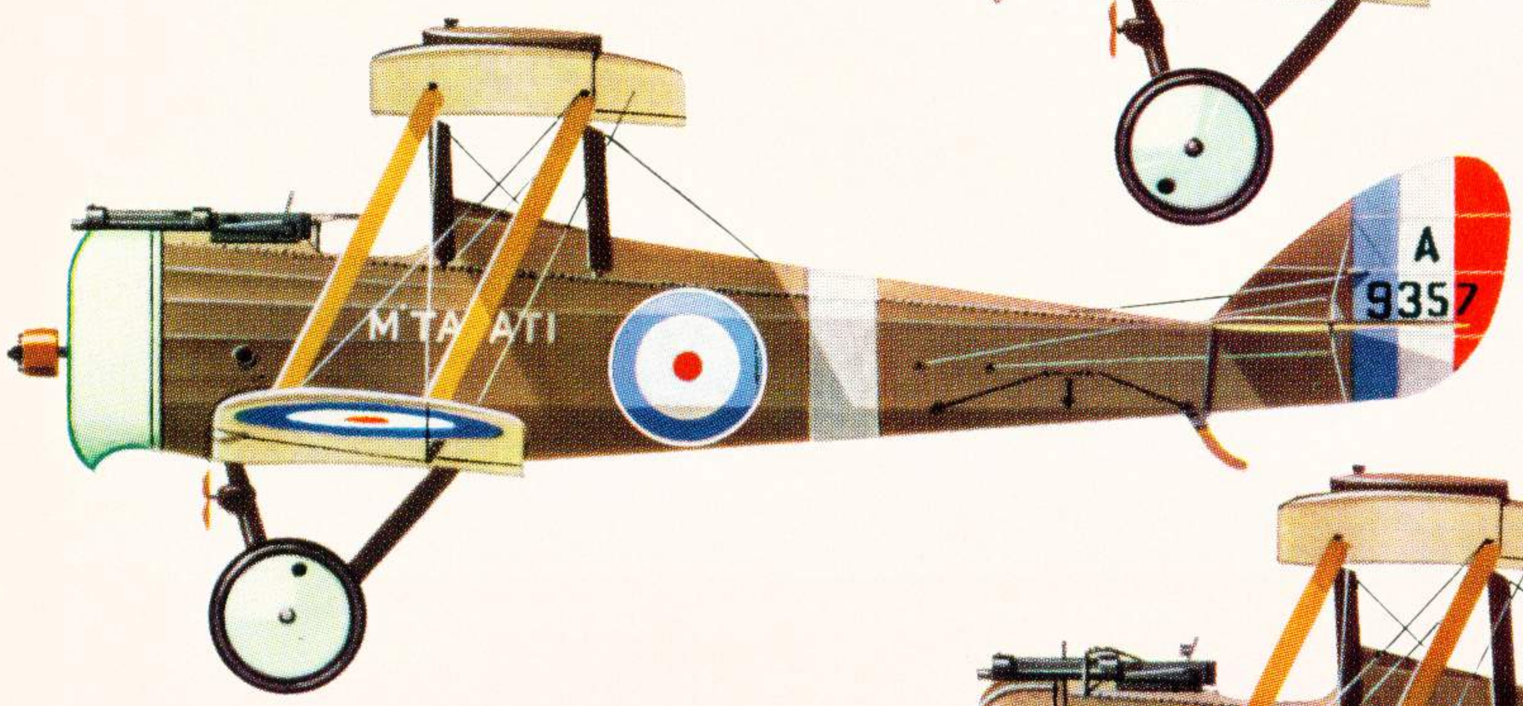


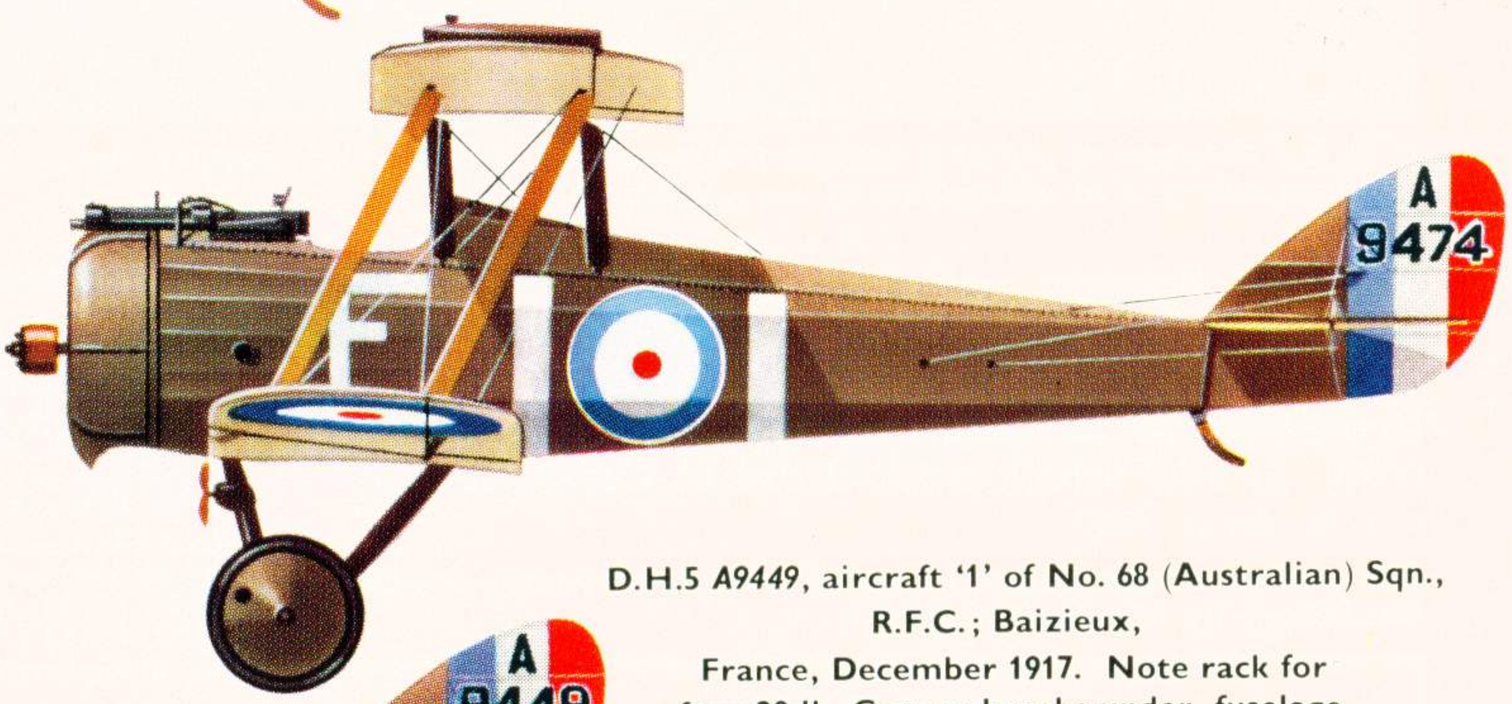
D.H.5 *A9435*, aircraft 'E' of No. 24 Squadron, R.F.C.; captured intact and evaluated by the Germans at Adlershof.



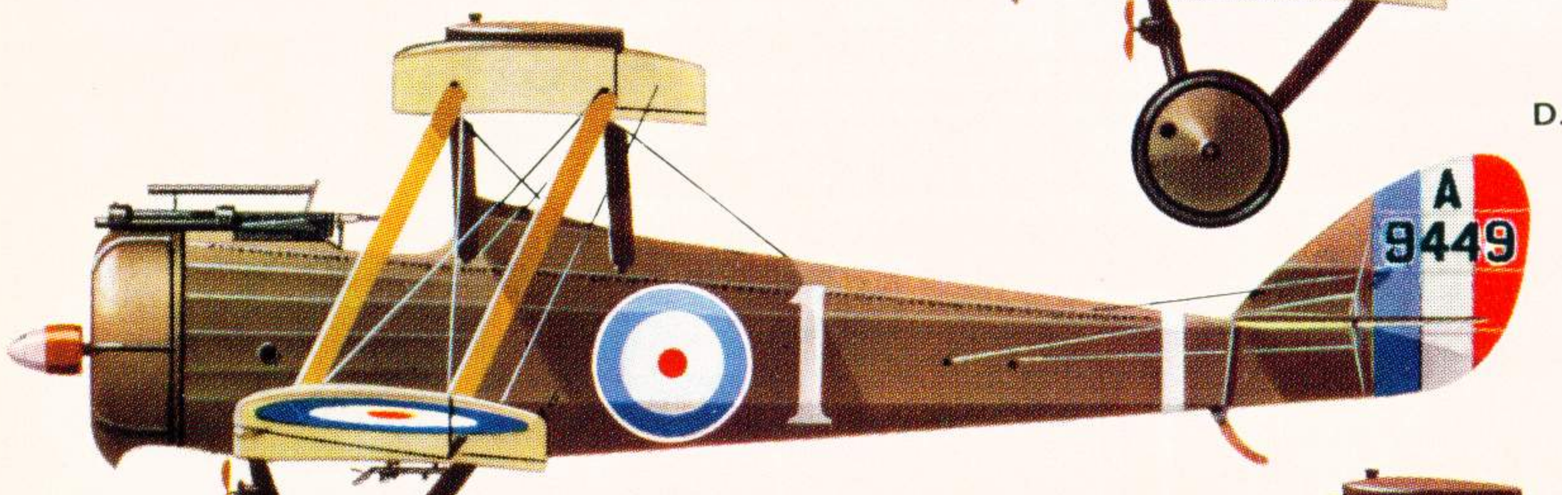
D.H.5, serial unknown, of No. 32 Sqn., R.F.C.; France, 1917.



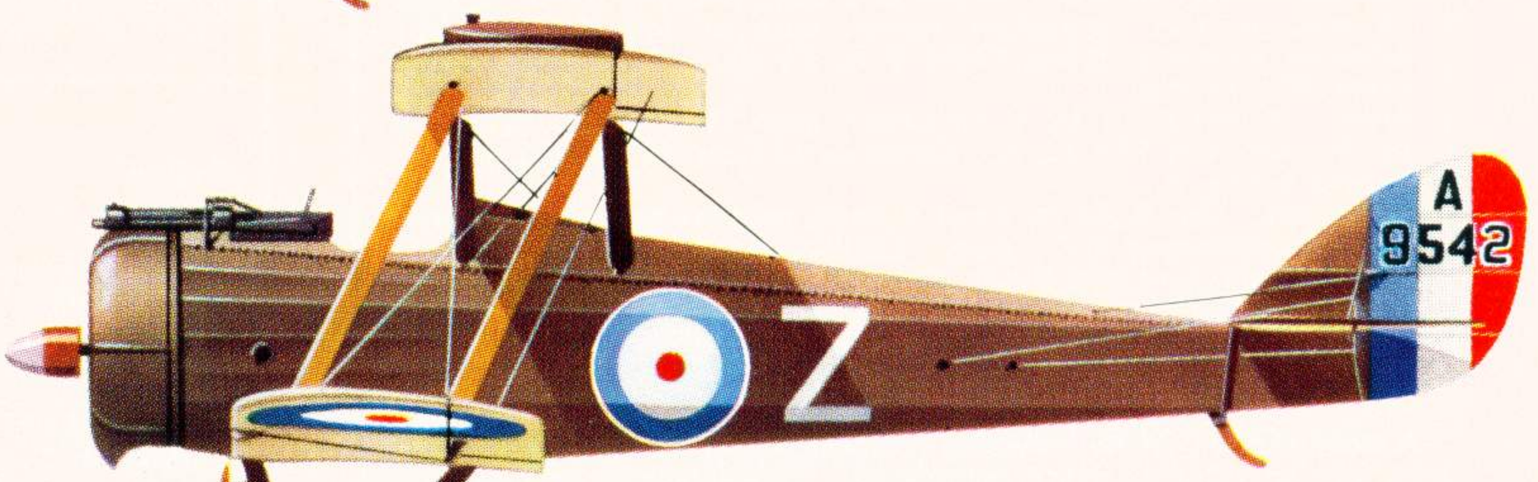
D.H.5 *A9357* "M'TACATI", possibly of No. 32 Sqn., R.F.C. in France; white fuselage band broader than was usual.



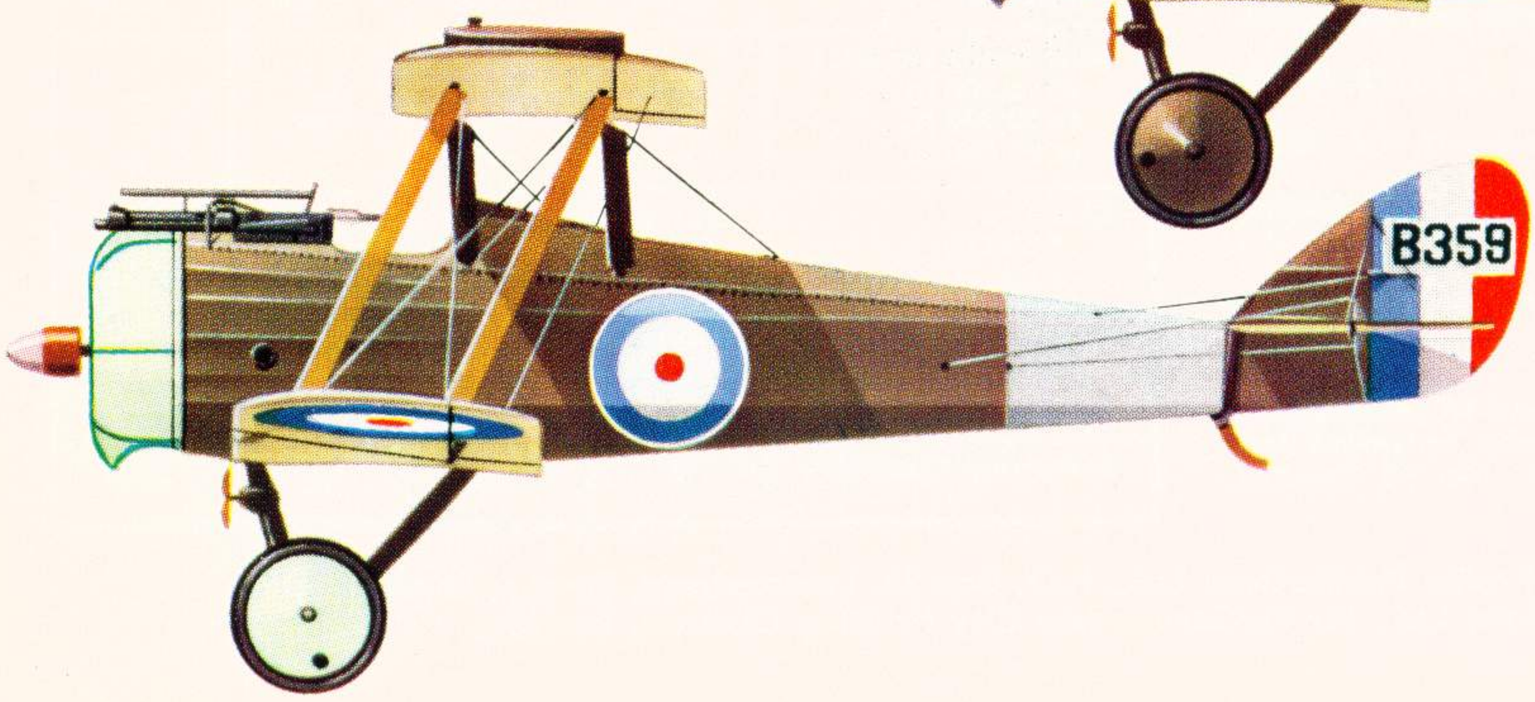
D.H.5 *A9474*, aircraft 'F' of No. 41 Sqn., R.F.C.; France, 1917.



D.H.5 *A9449*, aircraft '1' of No. 68 (Australian) Sqn., R.F.C.; Baizieux, France, December 1917. Note rack for four 20 lb. Cooper bombs under fuselage.



D.H.5 *A9542*, aircraft 'Z' of No. 68 (Australian) Sqn., R.F.C.; France, 1917.



D.H.5 *B359*, at one time operated by No. 24 Sqn., R.F.C., but illustrated here as it appeared later in the markings of a training unit. Black 'B' on underside of starboard lower wing; also note angular characters in which serial is presented.

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